

OVERVIEW OF COMMERCIAL FORESTRY SECTOR:

Analysis of BPS Survey of Manufacturing

June 2000

NRM Program
Policy and Planning Group
& Protected Areas and Forest Management Group

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PURPOSE AND STRUCTURE OF BRIEFING

PURPOSE

- Build awareness & understanding of BPS Forest Industry database: sources, assumptions, results.
- Move toward discussion on “big picture” and away from technical assumptions
- Begin discussing implications for forestry sector restructuring.

STRUCTURE – Two Main Parts

- Technical Presentation on BPS Data Set Analysis
 - *Background, Results, Further Work Needed*
- Implications for Wood-Based Industry Restructuring
 - *Possible Criteria, Approaches, Discussion*

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OVERVIEW OF FINDINGS

For Sawmills and Plywood Plants Only

THE BIGGEST FIRMS USE THE MOST WOOD – BY FAR

- Plymills (~120): most pressure on forests; twice that of sawmills
- There appears to be substantial under-reporting of wood intake
- Sawmills concentrated in Sumatera and Java
- Plymills concentrated in Kalimantan
- Employment is ~260,000 individuals; 40% are female

Estimated Total log intake for 1996: 33.1 million m³

- Plywood plants: 71% of total
- Reported Sawmills: 19% of total
- Small sawmills (estimated): 10% of total

More than “official” total log production; lower than some estimates

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POTENTIAL USES AND IMPLICATIONS

- Restructuring/rationalization of wood based industry
- Stolen wood/“illegal logging” (where to start, target)
- Incentives/policies – for replanting, especially
- Enforcement (where to start, where to target)

Need to discuss and agree on:

- findings, meaning, strategies for addressing issues
- Beginning with restructuring issues

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PART I:
TECHNICAL ANALYSIS OF BPS DATA SET ON
WOOD PRODUCTS INDUSTRY

- Background on BPS Data Set
- Graphic Overview of Results
- Discussion of Alternative Assumptions
- Further Work Needed

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BACKGROUND ON BPS DATA SET:
Survey of Large & Medium Manufacturers

- Standard questionnaire for all: attempts complete enumeration:
 - “Large” Firms have over 100 employees
 - “Medium” firms have 20-99 employees
 - “Small” (5-19) & “Household” (1-4) operations: not covered
- Mailing list is matched with other agencies; Some field checking
- BPS claims over 85% response rate, in general

- Allows detailed analysis: Results today focus on numbers of firms, distribution, processed wood output, wood input, employment
- Future analyses: earnings, expenditure, raw materials, etc.
- With other data sources: could look at indebtedness, ownership, location relative to wood supply, connection to concessions

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BPS DATA SET: Pros & Cons

Advantages

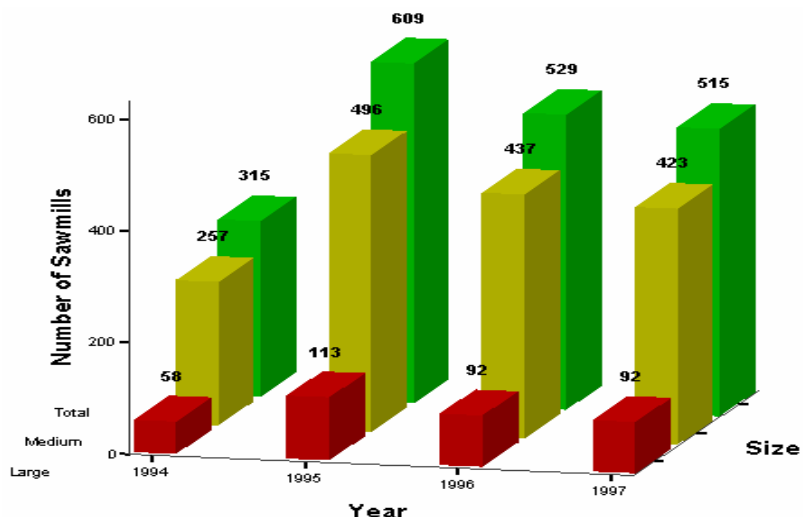
- Independently collected, processed, and stored
- Consistent survey approach over time
- Large sample allows reasonable projection to population
- Firm level data – can be disaggregated at many levels
- Potential for improving data in future through cooperative work with MOFEC, BPS, Trade Associations

Disadvantages

- Delay in obtaining the data: up to two years
- Some inaccuracies & outliers: needs cleaning & organizing
- Excludes small & household size operations (important?)
- Self-Reporting: may be inaccurate, biased, some non-reporting

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Number of Sawmills by Type, Size, Year



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Number of Sawmills by Type, Size, Year

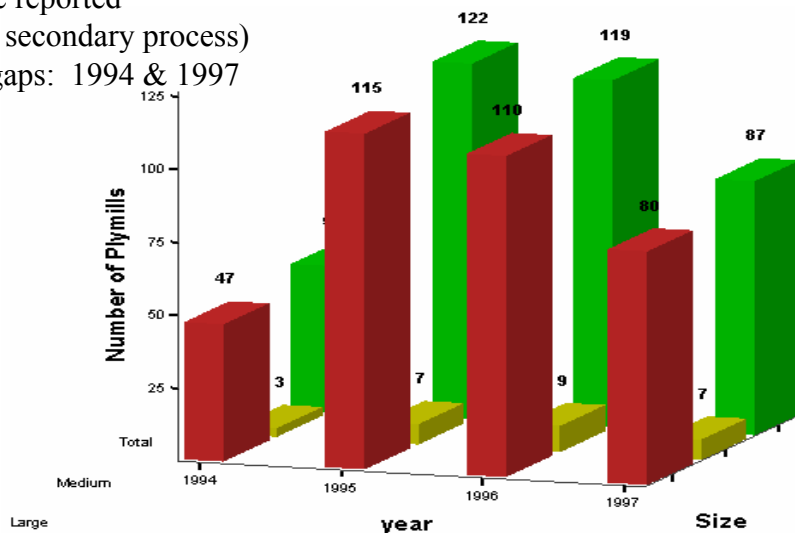
Sawmills

- Most reported sawmills are *Medium*, few are *Large*
- BPS found only ~ 600 medium-large firms
- May be incomplete sample
- Overall, BPS response rates: > 80-90%
- Estimates of existing sawmills vary: 2,300 to 3,000 (or more?)
- Solution: estimation assumes most remaining sawmills are *Small*
- Projection based on regression results
- Other estimation procedures possible
- Varying assumptions does not change overall results.

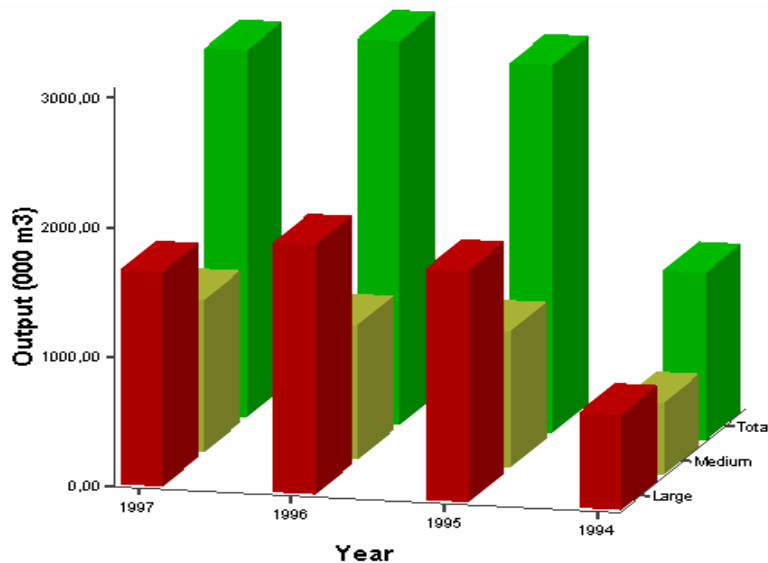
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Number of Plymills by Type, Size, Year

- Most are *Large*, by far
- All are reported
- (some secondary process)
- Data gaps: 1994 & 1997



Reported Sawmill Output by Type, Size and Year



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Reported Sawmill Output by Type, Size and Year

Sawmills

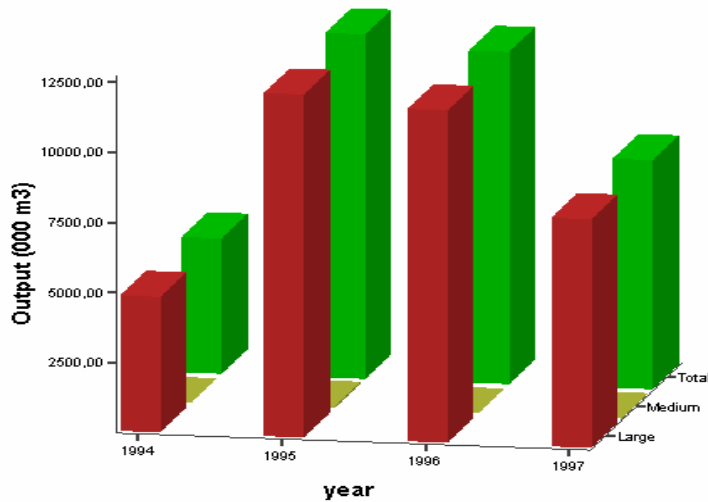
- Most reported establishments are *Medium*
- A small number of *Large* establishments produces most volume
- Overall reported output: 2.96 million m3 for 1996
- Input: 6.0 million m3 (with calculated/adjusted recovery factors)

If 2000 *Small* sawmills (not shown) represent those not surveyed

- If each produces 860 m3/year (average output for 20 employees)
- Then, *Small* sawmills add 1.72 million m3 (~3.4 million m3 input)
- Reported sawmill production is twice as large, 63% of total
- (Later figures include this assumption, then examine it)

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Reported Plymill Output by Type, Size and Year



- Virtually all plywood production comes from *Large* firms
- Output in 1996: 11.85 million m3 (23.7 million m3 input)
- Need a finer breakdown of size classes for better understanding

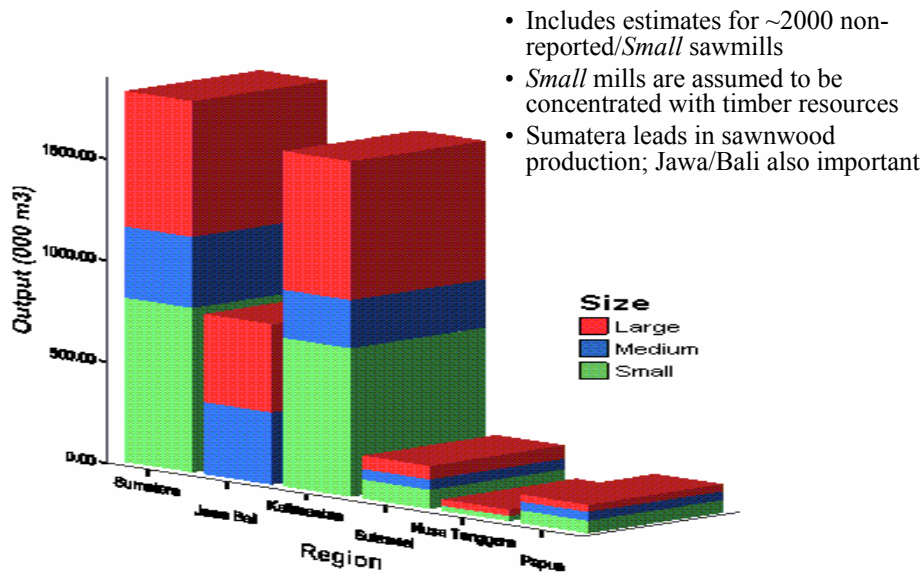
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Reported Employment: Basic Statistics

- Reported firms employ 260,000 people:
 - 20% in sawmills
 - 80% in plymills
- Roughly 40% of employees are female
- Plymills employ more women
- If 2000 non-reported/*Small* sawmills are included, could add 30 - 40,000 more employees

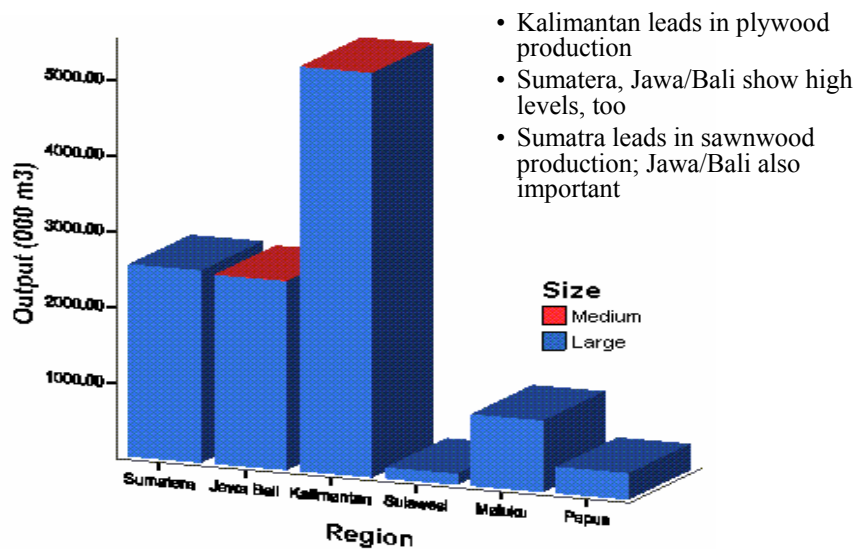
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Sawmills Output by Region for 1996



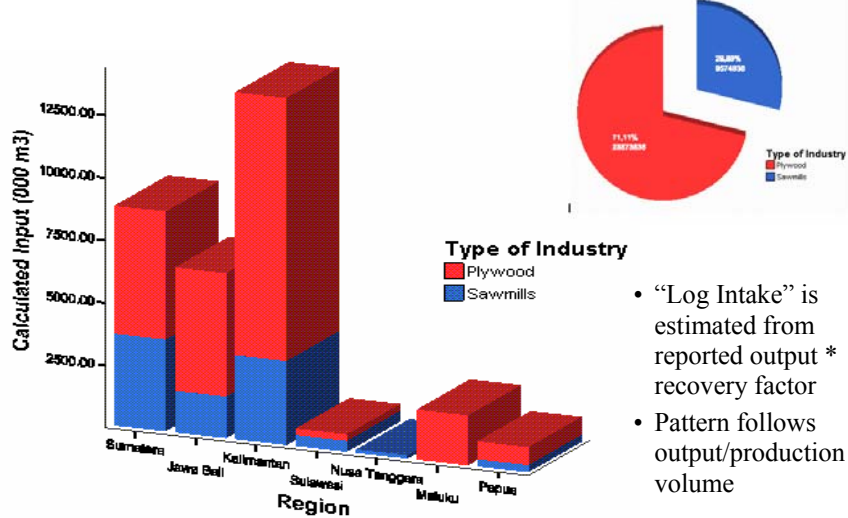
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Plymills Output by Region for 1996



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Aggregate Log Intake by Region for 1996



- “Log Intake” is estimated from reported output * recovery factor
- Pattern follows output/production volume

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Log Intake for 1996 by Type and Size

- Reported wood inputs were not technically credible compared to production (output)
- Suggests tendency to under-report wood use
- (Or poor record keeping on wood use, relative to output/sales)
- Log intake values were estimated from recovery factors calculated from reported data
 - Sawnwood: 49.0%; Plywood: 50.3%
- Log intake follows production volumes, so conclusions follow same pattern

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Estimated Total Log Intake in Indonesia 1996 (Typical Year) in M³

Sawmills:	9,400,000	
small/estimated:	3,400,000	7.2% of overall total
reported in sample:	6,000,000	12.6%
 Plymills:	 23,700,000	 48.9%
 Pulpmills:	 15,000,000	 31.1%
(est. from literature, not BPS database)		
 TOTAL	 48,200,000	

- More than log production officially reported by MOFEC
- Less than figures reported elsewhere, or capacity-based estimates
- Still, an enormous volume of wood: major pressure on forest

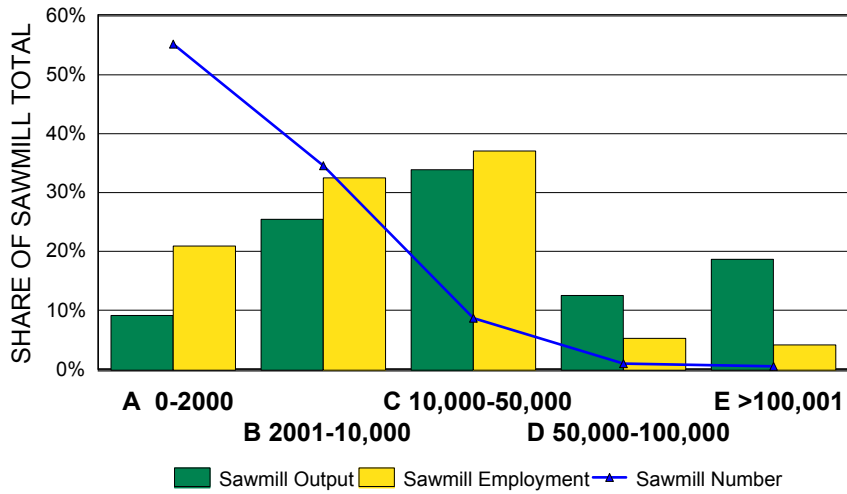
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Results of More Detailed Breakdowns:

- BPS employment classification (>100) not very detailed
- Created 5 production size classes (Output in m3) to examine which industry segments use which shares of resource
- Also, developed more detailed employment classes (not reported)
- This approach helps illustrate impacts of potential restructuring scenarios – if based on size or employment
- Next 3 figures do ***not*** include estimates for small sawmills

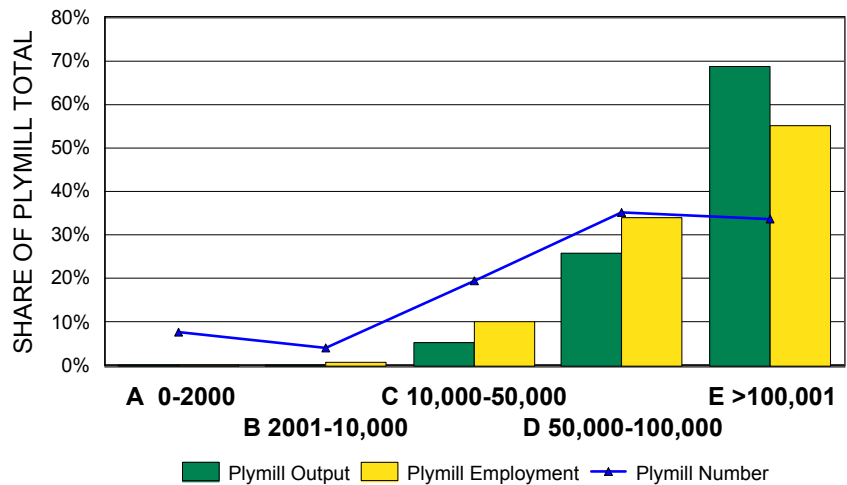
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SAWMILL DISTRIBUTION BY OUTPUT CLASSES (M3)



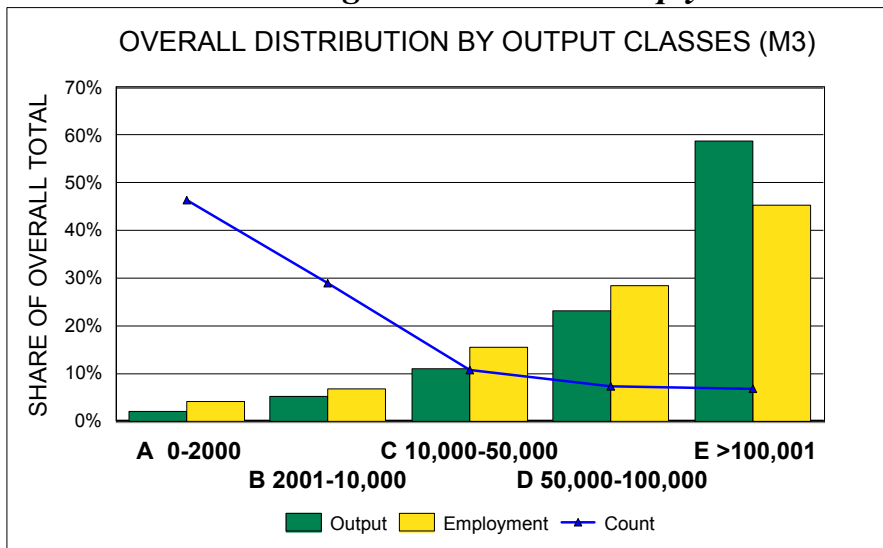
- 5% of largest producers use 30% of wood (& 10% of labor)
- This applies to medium & large sawmills, not all wood use₂₁

PLYWOOD MILL DISTRIBUTION BY OUTPUT CLASSES (M3)



- Same message: 30% of largest plymill employers use >60% of wood and half of labor

Now combining both sawmills and plymills



- 8% of largest producers use ~60% of the wood & 45% of labor

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Firm Size, Over-Capacity, and “Illegal Logging”: Discussion Must Recognize Many Forms of Illegal Activity

HPH/Forest Concessions Linked to Processing Facilities:

- Over harvesting Annual Allowable Cut (AAC)
- Harvesting protection areas (slopes and river banks)
- Under-reporting harvest and tax due
- Not following selective cutting guidelines
- Harvesting outside concession boundaries
- Abuse/falsification of log transport documents (SAK-B)

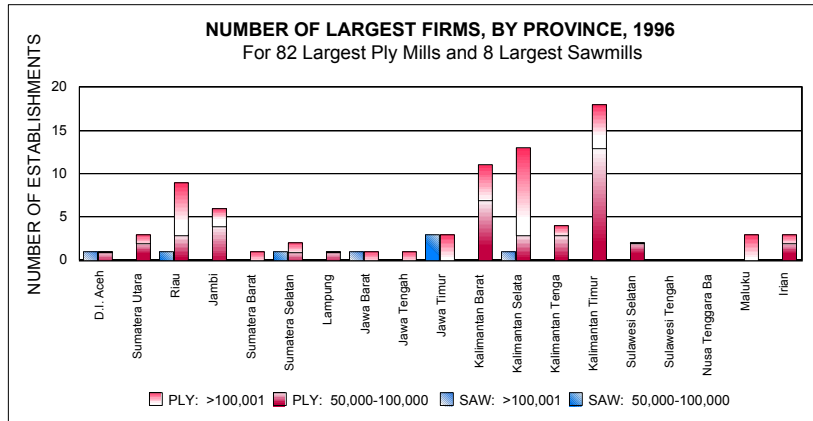
HTI/Industrial Timber Concessions Linked to Pulp Mills:

- Not planting HTI at required rates to attain sustainability
- Replanting HTI with low quality species or under-stocking
- Excessive reliance on “bridging” supply from conversion forests
- Acceptance of falsified log transport documents (SAK-B)

- Both groups contribute to over capacity vs. forest availability
- Smallest firms lack capacity to over-harvest at high levels

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LARGEST WOOD USING FIRMS: Number of Firms Mainly in Riau, Jambi, Kalimantan Barat, Selatan, and Timur



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Review of Alternative Assumptions

- What if there are more small firms producing more sawn wood?
- How does this compare to overall totals and shares?

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REVIEW OF THE “SMALL” SAWMILLS ASSUMPTIONS

CASE 1: “Low End” scenario: 2000 firms, with 20 employees

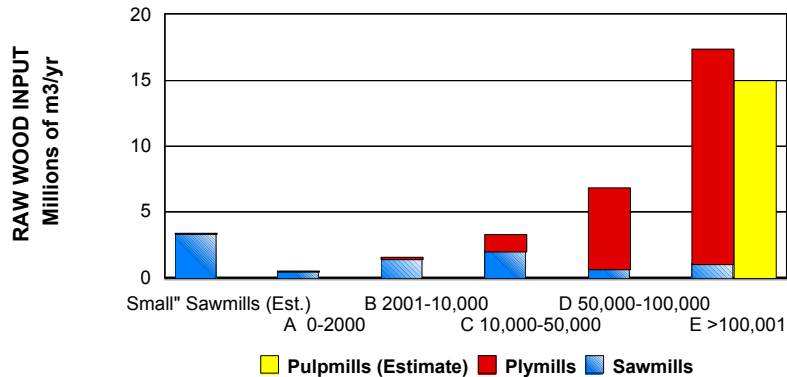
Output = 860 m³/yr (regression), Input = 1720 m³/yr based on RF

Convert to Wood Use/Input Volume & Include Pulp Mills....

DISTRIBUTION OF ESTIMATED WOOD INPUT/USE BY OUTPUT CLASSES

Assuming "Small" = 2000 mills @ 860 m³/yr, Sawn + Ply Wood = 16.5 M m³/yr

Total Wood Input => 33.2 M m³, ... With Pulp @ 15 M m³ => Total 48.2 M m³/yr



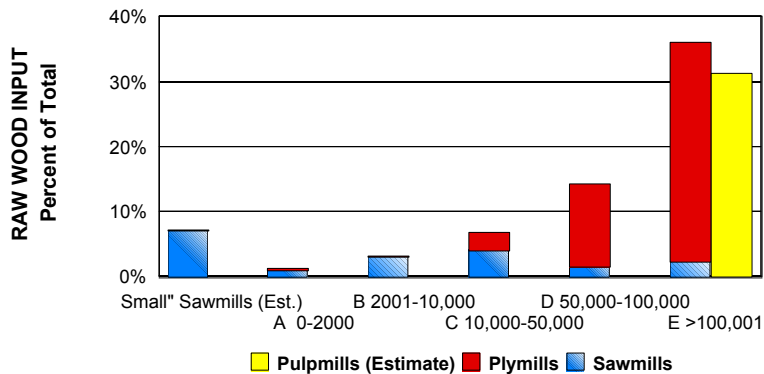
REVIEW OF THE “SMALL” SAWMILLS ASSUMPTIONS

CASE 1: Now, convert to percentages of total wood use....

DISTRIBUTION OF INPUT BASED ON OUTPUT SIZE CLASSES

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REVIEW OF THE “SMALL” SAWMILLS ASSUMPTIONS

CASE 2: “High End” Scenario: 3000 *Small* firms;

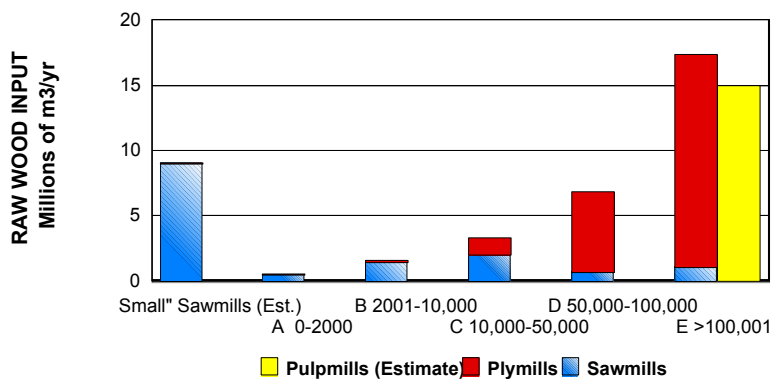
Output = 1500 m³/yr (ISA, FAO), Input = 3,000 m³/yr based on RF

Convert to Wood Use/Input Volume & Include Pulp Mills....

DISTRIBUTION OF ESTIMATED WOOD INPUT/USE BY OUTPUT CLASS

Assuming "Small" = 3000 mills @ 1500 m³/yr, Sawn + Ply Wood = 19.3 M m³/yr

Total Wood Input => 38.6 M m³, ... With Pulp @ 15 M m³ => Total 53.6 M m³/yr



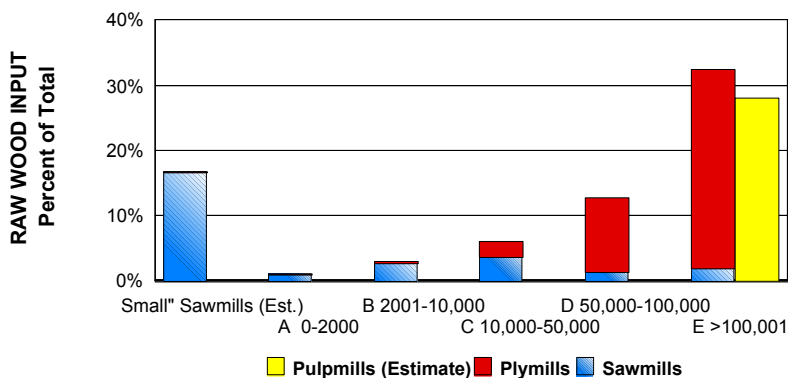
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Estimated Total Log Intake in Indonesia Showing Range of Results for 1996 in M³,

	Base Case “Low End”	Revised Case “High End”
Sawmills:	9,400,000	14,900,000
small/estimated:	3,400,000	9,000,000
reported in sample:	6,000,000	6,000,000
 Plymills:	 23,700,000	 23,700,000
Pulpmills:	15,000,000	15,000,000
 TOTAL	 48,200,000	 53,600,000

- Includes Does not include all industrial sectors
- Includes some small double counting of inputs

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Overlap In Wood Use (Double Counting)

Some Mills use/buy sawn wood as an input to production

- “Total output” could over-estimate timber use (pressure)
- SAW MILLS: “non round wood” ≈ 5-6% of input reported
- PLYWOOD: “non round wood” ≈ 2.4-3.0 % of input reported

For 1996, the double counted input volume would be:

- For sawn wood: 5.3% of 6.0 million m³ or 0.32 million m³
- For plymills: 2.7% of 23.7 million m³ or 0.64 million m³
- Assume smallest sawmills use raw timber, not pre-sawn wood

Overall total double counting: about 1 million m³

- Not large, but worth knowing about and placing bounds
- May be a reasonable first approximation

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SUMMARY OF MAIN POINTS (Again)

THE BIGGEST FIRMS USE THE MOST WOOD – BY FAR

- Plymills (~120): most pressure on forests; twice that of sawmills
- Sawmills concentrated in Sumatera and Java
- Plymills concentrated in Kalimantan
- Employment is ~260,000 individuals; 40% are female

Estimated Total log intake for 1996: 33.1 million m³

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More than “official” total log production; lower than some estimates

NEXT: Revising the assumptions for *Small* Sawmills does not change overall results by much...

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REAL SITUATION IS DYNAMIC

Note that the figures presented here are only snapshots

Other sources show that:

- Pulp is the fastest growing sector of wood use
- Plywood has been in decline
- Particle board is replacing plywood in many other countries
- Conversion forest (IPK Wood) is the fastest growing source of supply
- Market trends toward value added, downstream wood processing, diversified products

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FURTHER WORK

More Analysis

- Investigate Revenue/Expenditure data
- Link to taxes and debt, if possible
- Examine inputs and “double counting”
- Econometric Modeling: Frontier Function Analysis
- Consider *Krismon* Period: with 1998 data

Data Improvement

- Clean and organize more variables, more sectors
- Obtain 1998 data
- Discuss improvement strategies with MOFEC & BPS

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PART 2: IMPLICATIONS OF ANALYSIS FOR WOOD-BASED INDUSTRY RESTRUCTURING

- Consider Forest Sector Goals
- Implications of Analytical Results
- Restructuring is About Economics, not Environment
- Approaches to Restructuring/Rationalization
 - Reduce Demand => Downsizing
 - Rationalize Demand with Appropriate Supply
 - Increase Supply => Replanting
- Criteria for Consideration and Discussion

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Restructuring Must Achieve Some Agreement on Forest Sector Goals

Retain forest: How much natural forest to keep?

- Of this, what is the sustainable harvestable amount?
- And from that, what sustainable yield? ~ 1-2 m3/year?

Retain Employment: Can some be “retrained” to other sectors?

Sustain Earnings: Can revenues be high if scale is reduced?

- Alternative revenue streams
- Better enforcement and collection

Maintain Industry Base: Balance Use with Wood Supply

- Natural production forest – rapidly disappearing
- Conversion forest – rapidly increasing market segment
- Plantation forest – not being planted at expected/needed rates

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Implications of Analysis for Wood Based Industry Restructuring/Rationalization (based on conclusion that largest firms use most wood)

Seems to be agreement that “too much” wood is being harvested:

- Some estimates → 1.6 million ha/year
- Some estimates → 48-60 million m3 per year harvested
- Official reports and tax revenue register only about half of this
- MOFEC policy statements indicate desire to address this issue.

So, “forest industry restructuring” essentially means:

- “Downsizing” the level of use and impact on the forest
- “Rationalizing” wood use with appropriate sources of supply
- Increasing sources of supply through reforestation, incentives

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Restructuring Wood-Based Industry Is About Economics, not Environment

National-Level Competitiveness Issues

- Illegal harvesting “subsidizes” timber supply, distorts incentives for efficiency, market adjustment, re-investment
- Low cost, undervalued timber mainly subsidizes foreign consumers of exported wood products and pulp
- Balancing industrial demand with a stable, secure supply (through plantations and SFM) will enhance longevity of industry
- Removing indebted, inefficient, or lawless firms will enhance the competitiveness of the rest – both locally and internationally

Individual Firms’ Competitive Position Enhanced By:

- Investing in long term, renewable sources of supply: plantations
- Linking wood quality & type to production technologies, end uses
- Decreasing dependence only on large old growth timber

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Industrial Restructuring/Downsizing: Not a Policy Choice, but an Economic Reality

Overcapacity is not a natural condition, but the result of:

- Subsidies and directed industrial policies of the past
- Export controls and monopolization
- Dis-coordination between industry regulators & forest regulators

Restructuring (downsizing) is coming soon, managed or not:

- Forests are depleted; Forest sector firms are indebted
- Production technologies are out-dated and inefficient

Coordinated strategy could soften the landing:

- *Adjust down, don’t fall down*
- Plan for the future, with corrected incentives
- Balance demand and supply
- Reduce artificial and mis-targeted subsidies

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Approaches to Restructuring, “Downsizing”

What criteria might be considered for restructuring, downsizing?

- Production levels
- Employment levels
- Efficiency in use of wood
- Prices and incentives
- Indebtedness
- Age, expiration of license

What environmental and social criteria might be considered?

- Carrying capacity of forest land, plantation land
- Employment needs and potential
- Locations of populations and forests

Need an integrated, coordinated strategy

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How to Target Reductions? Scenarios for Discussion

- Close, downsize only the few, largest firms
- Relocate firms → close or move those with no forest nearby
- Close, downsize the most indebted firms
 - Maybe substantial overlap with largest firms?
- Consider delinking forests from production facilities
- Consider re-investment needs, new technologies
- Consider special status of Inhutani: size, location, earnings
- Other options for discussion?
 - Based on location (relative to demand, transport, forest)?
 - Based on availability of alternative employment?
 - Minimize impact on employment, revenue?
 - Multiplier/linkage effects with local/regional economy?

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Considerations for Rationalizing Wood Demand-Supply Based on End Use

- Plywood Plants
- Sawmills
- Pulp mills

- Different products
- Different qualities
- Different fiber needs

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Considerations for Rationalizing Wood Demand-Supply Based on End Use

Plywood Plants:

- International market, competition with many products & qualities
- Natural forest: good for large diameter logs of important species
- Long rotation plantations: can meet some plywood/particle board needs
 - (Note: natural forest concessions are *supposed* to work this way: re-supply by natural or augmented regeneration)
- Modify (“re-tool”) the mills → technological changes or diversification on size, species, products, value added
- Plywood directly exported: low linkage/multiplier?

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Considerations for Rationalizing Wood Demand-Supply Based on End Use

Sawmills:

- Much sawn wood serves local uses or downstream processing
- Plantation wood is the obvious source for much sawn timber
- Substitute woods/species: no need for largest trees, best species
- Substitute products (value added)
- High linkage/multiplier in local economy?

Pulp Mills:

- Plantation & imports can serve this use
- No technical need for natural forests
- Are pulp mills planting, using plantation wood?

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Brief Note on Multipliers & Local Economic Linkages (BPS I/O Table 1995)

Output Multiplier Effects:

- An increase in sawn wood output value creates an additional “multiplier” of 1.97 units of output value in overall economy
- For plywood, the “output multiplier” is 1.88, about 5% lower

Income Multiplier Effects

- For an increase in sawn wood output value, about 27% would accrue to household incomes
- For plywood, income multiplier is 22%, about a fifth lower

May be factors to consider in restructuring and decentralization

- Local economy linkages/multipliers may be higher for some subsectors in some regions than for economy as a whole

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Rationalizing Demand-Supply Based on End Use
Enhancing Supply: Plantation Wood is Sustainable

If 1 ha of plantation produces 200 m³ of timber over 8 years...

- Then 5 million ha of plantation can produce $5/8 \times 200 =$
- 125 million m³ of wood fiber/year sustainably
- Planting one hectare costs about \$1000

Twice Indonesia's current use of wood (48-60 million m³/yr)

- (But, ...plantation wood can't substitute into plymills in SR)

Yet, 1.6 million ha are being deforested/year: not replanted

- If even half were replanted to timber only 3 years running ...
- Indonesia's wood supply would be secured forever.

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***COMMENTS,
QUESTIONS,
DISCUSSION ...***

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